

### Patent Claims

1. Water treatment agent for the long-term improvement of the water quality of biological maintenance systems, characterised by a content of
  - a) at least one easily or sparingly soluble  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{TiO}^{2+}$  or  $\text{ZrO}^{2+}$  salt of an organic carboxylic acid, possibly in admixture with an organic carboxylic acid;
  - b) at least one water-soluble N-free, biologically decomposable organic compound;
  - c) at least one soluble alkali metal or alkaline earth metal salt of an organic carboxylic acid and
  - d) at least one  $\text{Mg}^{2+}$  salt of an organic carboxylic acid, possibly in admixture with at least one  $\text{Ca}^{2+}$  salt of an organic carboxylic acid, as well as
  - e) trace elements and vitamins, especially water-soluble vitamins of the B series.
2. Agent according to claim 1 containing
  - a) an  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{TiO}^{2+}$  and/or  $\text{ZrO}^{2+}$  acetate, formate, tartrate and/or especially citrate;
  - b) at least one carboxylic acid, an alcohol and/or a sugar;

- c) an alkali metal or alkaline earth metal salt of citric, acetic, lactic, tartaric, formic or malic acid and
  - d) a  $\text{Ca}^{2+}$  or  $\text{Mg}^{2+}$  salt or a mixture of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  salts of organic carboxylic acids, as well as
  - e) trace elements and vitamins, especially water-soluble vitamins of the B series.
- 3. Agent according to claim 1 or 2, containing aluminium citrate and/or iron citrate as component a).
  - 4. Agent according to claim 1 or 2, containing as component b) acetic, citric, tartaric or lactic acid, glycerol, sorbitol or ethanol or a pentose, a hexose or saccharose.
  - 5. Agent according to claim 4 containing as component b) a combination of citric acid, tartaric acid and saccharose.
  - 6. Agent according to claim 1 or 2 containing as component d) a sodium and/or magnesium salt of citric and/or tartaric acid.
  - 7. Agent according to claim 1 or 2 containing as component e) magnesium citrate and/or tartrate, possibly in admixture with calcium citrate and/or tartrate.
  - 8. Agent according to claim 1 or 2 containing as trace elements iron, boric acid, bromide, iodide, lithium, tin, manganese, zinc, nickel, copper, vanadium, molybdenum and/or cobalt.

9. Agent according to claim 1 or 2 containing as vitamins vitamin B1, B2, B6, B12, nicotinic acid amide, panthenol and/or biotin.
10. Agent according to claims 1 to 9 containing, per dosage unit for 1 l of maintenance water, the components in the following amounts:
- a) 0.5 - 50 mg, preferably 0.5 - 10 mg;
  - b) one or more organic compounds, preferably citric acid, saccharose and/or tartaric acid, in each case 0.5 - 100 mg, preferably 0.5 - 50 mg, especially preferably 1 - 20 mg;
  - c) 0.018 - 1.8 mmol alkali metal salt, preferably 0.036 - 0.36 mmol, or 0.009 - 0.9 mmol alkaline earth metal salt, preferably 0.018 - 0.18 mmol, or corresponding mixtures of alkaline earth and alkali metal salts;
  - d) 0.0018 - 0.36 mmol magnesium salt, preferably 0.018 - 0.18 mmol;
  - e) 1 - 100 µg iron, preferably 2 - 20 µg;  
0.5 - 50 µg boric acid, preferably 0.5 - 10 µg;  
0.1 - 100 µg bromide, preferably 0.1 - 5 µg;  
0.01 - 100 µg iodide, preferably 0.1 - 10 µg;  
1 - 200 ng lithium, preferably 5 - 100 ng;  
1 - 200 ng tin, preferably 5 - 100 ng;  
0.1 - 100 µg manganese, preferably 0.2 - 20 µg;  
0.1 - 100 µg zinc, preferably 0.1 - 10 µg;  
0.01 - 20 µg nickel, preferably 0.05 - 5 µg;

0.01 - 20  $\mu\text{g}$  copper, preferably 0.05 - 5  $\mu\text{g}$ ;  
1 - 500 ng vanadium, preferably 5 - 100 ng;  
1 - 500 ng molybdenum, preferably 5 - 100 ng;  
0.1 - 50 ng cobalt, preferably 0.5 - 20 ng;  
0.1 100  $\mu\text{g}$  vitamin B1, preferably 0.1 50  $\mu\text{g}$ ;  
0.05 50  $\mu\text{g}$  vitamin B2, preferably 0.05 10  $\mu\text{g}$ ;  
0.01 30  $\mu\text{g}$  vitamin B6, preferably 0.05 10  $\mu\text{g}$ ;  
0.05 - 50 ng vitamin B12, preferably 0.1 - 10 ng;  
0.1 - 50  $\mu\text{g}$  nicotinic acid amide, preferably 0.1 - 20  
 $\mu\text{g}$ ;  
0.1 - 100  $\mu\text{g}$  panthenol, preferably 0.1 - 10  $\mu\text{g}$ ; and  
0.01 - 10  $\mu\text{g}$  biotin, preferably 0.01 - 1  $\mu\text{g}$ .

### Summary

There is described a composition for the long-term improvement of the water quality of biological maintenance systems characterised by a content of

- 1) at least one easily or sparingly soluble  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{TiO}^{2+}$  or  $\text{ZrO}^{2+}$  salt of an organic carboxylic acid, possibly in admixture with an organic carboxylic acid;
- 2) at least one water-soluble N-free, biologically decomposable organic compound;
- 3) at least one soluble alkali metal or alkaline earth metal salt of an organic carboxylic acid and
- 4) at least one  $\text{Mg}^{2+}$  salt of an organic carboxylic acid, possibly in admixture with at least one  $\text{Ca}^{2+}$  salt of an organic carboxylic acid, as well as
- 5) trace elements and vitamins, especially water-soluble vitamins of the B series.

With the help of the described composition, changes of the water quality-determining parameters can be reduced, minimised or eliminated and thus a significant reduction of the partial water exchange frequency or a distinct prolongation of the water exchange-free intervals achieved therewith.